REMARKS/ARGUMENTS

REMARKS

1. The Applicant has sought to voluntarily amend claims 6 and 7 and to add new claim 29 in order to make the terms "plurality of reference points" and "periodic elements" clearer.

2. In paragraph 2 of the Office Action the Examiner has rejected claims 1 and 26-30 as being obvious in light of Bennett et al (USPN 5,051,736). In paragraph 3 of the Office Action, the Examiner has rejected claims 2-10, 24 and 25 as being obvious in light of Bennett in view of Joyce (USPN 4,814,553).). In paragraph 5 of the Office Action, the Examiner has rejected claims 14 – 17 and 19 – 23 as being obvious over Bennett in view of Masaki et al (USPN 5,159,321). In paragraph 6 of the Office Action, the Examiner has rejected claim 18 as being obvious over Bennett in view of Giobbi et al (USPN 5,469,193).

3. In response, the Applicant has sought to amend independent claim 1 to more clearly distinguish the claimed invention from the prior art. Amended claim 1 defines the orientation data as being *"indicative of three dimensions of an orientation of the sensing device."* In support of the inventiveness of amended claim 1, the Applicant makes the following arguments:

(a) Position and orientation are not the same thing;

(b) Joyce only discloses one dimension of orientation, namely yaw;

(c) Bennett only discloses one dimension of orientation, namely tilt angle;

(d) Even if Joyce and Bennett could be combined, their combination would disclose, at most, two dimensions of orientation;

(e) It is not possible to infer three dimensions of orientation from two dimensions of orientation; and

(f) The combination of Joyce and Bennett does not disclose three dimensions of orientation as claimed in amended claim 1.

The following paragraphs expand upon these arguments.

4. Position and orientation are not the same thing:

When a sensing device, having a nib, is used to write on a surface, the nib will have a particular position at a particular point in time. That position is normally represented by two co-ordinates, such as x and y.

As the sensing device is used to write on the surface, the sensing device itself will have an orientation relative to the surface. That orientation is normally represented by three co-ordinates such as pitch, roll and yaw or azimuth, altitude and twist.

If the nib of the sensing device is held against the surface and the housing of the sensing device is moved around whilst keeping the nib in place, the position of the nib will stay the same but the orientation of the sensing device will change.

The vast majority of the disclosure contained in Bennett concerns the position of the nib of the stylus relative to the page. Similarly, the vast majority of the disclosure contained in Joyce concerns the position of the mouse relative to the page.

It is important to distinguish the position of the nib from the orientation of the sensing device, so that we can accurately understand what Bennett and Joyce are talking about.

Joyce supports this differentiation between position and orientation in the following paragraph taken from col. 2, lines 51 to 59:

> *"The irregular surface line pattern establishes an identity between mouse output signals and mouse position vectors whereby any particular output signal uniquely corresponds to a single mouse position vector on the surface. A microprocessor or similar computing device is preferably utilized to convert these output signals into meaningful mouse position data. This data may include the angular* ***orientation*** *of the mouse* ***as well as its position*** *with respect to the surface."*

By using the phrase *"as well as"*, it is clear that Joyce understands *"orientation"* and *"position"* to be two different things.

5. Joyce only discloses one dimension of orientation, namely yaw:

The passage quoted above from Joyce illustrates the disclosure regarding the x, y plane orientation (or yaw) of the Joyce mouse relative to the surface. There is no disclosure in Joyce of any additional dimensions of orientation (such as pitch or roll).

In addition, one would not expect Joyce to disclose ways of detecting additional dimensions of orientation since the Joyce mouse would not work if it was inclined at an angle to the x, y plane.

Accordingly, Joyce only discloses one dimension of orientation, namely yaw.

6. Bennett only discloses one dimension of orientation, namely tilt angle:

As discussed above, the vast majority of the disclosure in Bennett relates to the position of the nib of the Bennett stylus. Bennett contains just one brief paragraph which refers to orientation. That paragraph only refers to one degree of orientation, namely tilt angle.

The passages quoted by the Examiner as referring to orientation do not in fact refer to orientation, but to nib position. For example, the Examiner quotes Bennett col. 9, lines 57-62. The sentences at col. 9, lines 55 to 58 read:

> *"These TAC's contain the digitally encoded X, Y position information... Each TAC is divided into an array of positions."*

It is clear that these passages are talking about nib position, not the orientation of the stylus.

In his analysis of claim 34, the Examiner suggests that Bennett col. 11, lines 59 to 62 disclose orientation data indicative of *"three dimensions of the orientation of the sensing device, specifically the x-y position."* The paragraph in Bennett located at col. 11, line 59 to col. 12 line 4 reads:

> *"It is also possible to determine the tilt angle of the stylus (a potentially useful piece of information in some applications) by analysing the perspective distortion of the TAC shape. More important, using this angle and knowledge of the indices of refraction of the tablet materials, the offset from parallax can be corrected. Note that this does not address the problem of user perceived parallax, only the parallax seen by the stylus optical imaging system. The user's parallax will be a function of the total thickness of the tablet, and the distance to the underlying display, if such is being used. The tablet thickness can be made to be essentially negligible (a few thousandths of an inch) with respect to this problem."*

It is difficult to see how the Examiner has inferred from this passage that Bennett discloses three dimensions of orientation. In addition, by saying *"specifically the x-y position"* the Examiner shows that he is confusing orientation with x-y position.

The disclosure in this passage concerns tilt angle, but does not concern *"three dimensions of an orientation of the sensing device relative to the surface."*

Bennett therefore only discloses one dimension of orientation, namely tilt angle.

7. Even if Joyce and Bennett could be combined, their combination would disclose, at most, two dimensions of orientation:

We shall argue in paragraphs 11 (b) and (c) that Joyce and Bennett should not be combined, but for the sake of argument we shall assume that their disclosures could possibly be combined. Since Joyce discloses only one dimension of orientation, namely yaw, and since Bennett only discloses one dimension of orientation, namely tilt angle, their combined disclosure could at most disclose a system with two dimensions of orientation.

8. It is not possible to infer three dimensions of orientation from two dimensions of orientation:

In order to ascertain a three dimensional orientation, three variables must be known. It does not particularly matter whether these variables are pitch, roll and yaw or whether they are azimuth, altitude and twist. The important thing is that there are **three** variables. If you only know the pitch and roll of a sensing device you cannot infer the yaw from those two variables. If you only know the altitude and twist of a sensing device you cannot infer the azimuth from those two variables.

Accordingly, it is not possible to infer three dimensions of orientation from two dimensions of orientation.

9. The combination of Joyce and Bennett does not disclose three dimensions of orientation as claimed in claim 1:

The combination of Bennett and Joyce (if possible) could at most disclose a sensing device which detects two dimensions of orientation. Since three dimensions of orientation cannot be inferred from just two dimensions of orientation, the Applicant submits that the combination of Joyce and Bennett does not disclose *"A sensing device for generating three-dimensional orientation data... the orientation data being indicative of three dimensions of an orientation of the sensing device relative to the surface"* as claimed in amended claim 1.

10. In light of the above amendments and arguments, the Examiner is requested to reconsider and withdraw his obviousness objection to claim 1. Since claim 1 is not obvious, the Applicant submits that dependent claims 2 to 31 are similarly non-obvious.

11. Although the above arguments should be sufficient to convince the Examiner of the inventiveness of the claims, for completeness, the Applicant would like to submit the following additional arguments:

(a) Bennett does not contain an enabling disclosure of tilt angle:

The sentence quoted by the examiner from Bennett col. 11 lines 59 to 62 is the entire disclosure in Bennett of a method of determining the tilt angle of the stylus. The sentence merely states that it is possible to determine the tilt angle of the stylus by analysing the perspective distortion of the TAC shape. It does not say how this might be done. The Applicant submits that this disclosure is not sufficient to enable a person of ordinary skill in the art to determine the tilt of the stylus.

In contrast, the Applicant's specification contains detailed disclosure, including mathematical equations, of at least one example of a method of determining the three dimensional orientation of the Netpage pen on pages 88 to 93 under the headings "8.2.1 Pen Orientation" and "8.2.2 Image Sensing."

(b) There is no motivation to combine Bennett with Joyce:

The Bennett system is able to decode the TAC's and compute the x, y position of the stylus nib without having to calculate yaw. We have discussed above that the only dimension of orientation disclosed in Joyce is yaw. Since the Bennett system does not need to calculate yaw, there would be no motivation for one of ordinary skill in the art to seek to combine a yaw-generating system like Joyce's with Bennett. There is therefore no motivation to combine Bennett with Joyce

(c) Joyce teaches away from a combination with Bennett:

Because the Joyce mouse is designed to be moved across a flat surface, it would not work if it were inclined at an angle to the surface. There is therefore no motivation to seek to detect additional dimensions of orientation in the Joyce system. One of ordinary skill in the art would not be motivated to combine the (inadequately disclosed) tilt detection method of Bennett with Joyce, since if one were to tilt the mouse of Joyce it would not work.

In anticipation of the Examiner pointing to the disclosures in Joyce on col. 1, line 64 to col. 2, line 16 as support for a motivation to combine Joyce with Bennet, the Applicant makes the following point. Those paragraphs describe the potential application of the Joyce invention to the detection of the position of a milling head. Even in that potential

application, the mouse is still used over a flat surface (*"a fixed vertical member of the milling machine"*) and is never tilted at an angle to the surface.

Since the Joyce arrangement would not work if tilted at an angle to the surface, Joyce teaches away from a combination with the tilt angle disclosure in Bennett. As such, Joyce teaches away from a combination with Bennett.

Very respectfully,

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